

WHAT IS CLAIMED IS:

1. A balloon dilatation catheter, comprising:

an elongate shaft having a proximal end and a distal end; and

a balloon connected to the distal end of the shaft, the balloon having an expandable region and a balloon waist, the balloon waist including a plurality of voids prior to thermal reformation that cause the balloon waist to have a reduced profile subsequent to thermal reformation.
2. A balloon dilatation catheter as in claim 1, wherein the balloon waist has a material volume per unit length, and wherein the plurality of voids reduce the material volume per unit length.
3. A balloon dilatation catheter as in claim 2, wherein the material volume per unit length decreases to cause the balloon waist to taper.
4. A balloon dilatation catheter as in claim 1, wherein the size, number and position of the plurality of voids are selected to cause the balloon waist to taper.
5. A balloon dilatation catheter as in claim 1, wherein a proximal balloon waist and a distal balloon waist include a plurality of voids prior to thermal processing that cause the balloon waists to have a reduced profile subsequent to thermal processing.

6. A balloon dilatation catheter as in claim 5, wherein the elongate shaft includes an inner tubular member disposed in an outer tubular member, and wherein the proximal balloon waist is connected to a distal end of the outer tubular member and the distal balloon waist is connected to a distal end of the inner tubular member.

7. A balloon dilatation catheter as in claim 1, wherein the plurality of voids are wedge shaped.

8. A balloon dilatation catheter as in claim 1, wherein the plurality of voids are circular.

9. A balloon dilatation catheter as in claim 1, wherein the plurality of voids are rectangular.

10. A balloon dilatation catheter as in claim 1, wherein the plurality of voids are diamond shaped.

11. A balloon dilation catheter, comprising:
an elongate shaft having a proximal and a distal end; and
a molded balloon attached to the distal end of the shaft, the balloon being molded to have an expandable region and a balloon waist, the balloon waist having a material volume per unit length, wherein the material volume per unit length after attachment to

the distal end of the elongate shaft is less than the material volume per unit length immediately after molding of the balloon.

12. A balloon dilatation catheter as in claim 11, wherein the material volume per unit length decreases to cause the balloon waist to taper.

13. A balloon dilatation catheter as in claim 11, wherein the material volume per unit length is controlled by the formation of a plurality of voids in the balloon waist.

14. A balloon dilatation catheter as in claim 13, wherein the size, number and position of the plurality of voids are selected to cause the balloon waist to taper.

15. A balloon dilatation catheter as in claim 13, wherein the plurality of voids are wedge shaped.

16. A balloon dilatation catheter as in claim 13, wherein the plurality of voids are circular.

17. A balloon dilatation catheter as in claim 13, wherein the plurality of voids are rectangular.

18. A balloon dilatation catheter as in claim 13, wherein the plurality of voids are diamond shaped.

19. A method of manufacturing a balloon catheter comprising the steps of:
providing a catheter shaft having a proximal end and a distal end;
providing an expandable balloon having a waist and an expandable portion;
forming a plurality of voids in the balloon waist;
thermally reforming the waist to close the voids and to reduce the profile of the waist; and
attaching the waist to the distal end of the catheter shaft.

20. A method of manufacturing a balloon catheter as in claim 19, wherein the step of attaching the waist comprises a thermal bonding process.

21. A method of manufacturing a balloon catheter as in claim 20, wherein the steps of thermally reforming the waist and attaching the waist are performed simultaneously.

22. A method of manufacturing a balloon catheter as in claim 19, wherein the balloon waist comprises a polymer which melts and flows into the plurality of voids during the step of thermal reforming.